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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/518,183	12/16/2004	Rainer Bott	M1211/20018	5602

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EXAMINER	
MALEK, LEILA	

ART UNIT	PAPER NUMBER
2611	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/518,183	BOTT ET AL.	
	Examiner	Art Unit	
	Leila Malek	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 December 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/16/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Applicant's claim for the benefit of a prior-filed PCT is acknowledged.

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed on 12/16/2004.

Information Disclosure Statement

3. The information disclosure statement submitted on 12/16/2004 has been considered and made of record by the examiner.

Drawings

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the equalization and demodulation, as cited in claim 1, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering

of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. As to claim 1, applicant recites that the scatterer coefficients include attenuation, delay, and Doppler frequency. However, in the invention disclosure, page 4, lines 8-18, Applicant discloses that the scatterer matrix includes scatterer coefficients M and K, which represent Standardized delay and standardized Doppler shift, respectively. In this matrix there is no coefficient defined for attenuation of the signal. Furthermore, Applicant discloses (See page 4, lines 14-16), that the coefficients of the matrix represent the complex-valued attenuation values. However, it is not clear whether M and K represent attenuation, or there are other coefficients, which represent the attenuation of signal?

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 1 recites the limitation "the scatterer coefficients", on line 3. There is insufficient antecedent basis for this limitation in the claim.

7. Claims 3, 4, and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. As to claims 3, 4, and 6, limitation "wherein its use" is vague and indefinite. Because "its" does not point out to any specific limitation.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. ("Generation of scattering functions by computer simulation for mobile communication channels", Vehicular Technology Conference, 1996. 'Mobile Technology for the Human Race'., IEEE 46th; Publication Date: 28 Apr-1 May 1996, Volume: 3, On page(s): 1443-1447 vol.3.), in view of Wiedeman et al. (hereafter, referred as Wiedeman) (US 5,796,760).

As to claim 1, Wang discloses a data signal transmitted via a time-variant channel to a receiver (see page 1443), wherein scatter coefficients including attenuation

(see page 1444, left column), delay and Doppler frequency (see page 1444, right column) in the received data signal, which cause signal distortion in the channel, are measured in the receiver (see pages 1443 and 1444). Although Wang does not disclose that the signal is transmitted using a single-carrier or multi-carrier, in order to transmit the signals from transmitter to the receiver, inherently, there must be at least one carrier (single carrier). Wang discloses all the subject matters claimed in claim 1, except that the data signal is equalized with the scatterer coefficients and then demodulated with them. Wiedeman discloses a receiver apparatus comprising an equalizer and a demodulator, wherein the equalizer equalizes a Doppler frequency offset (interpreted as the first scatterer coefficient) for each correlated signal and the delay (interpreted as the second scatterer coefficient) of each of the correlated signals (See column 15, last paragraph). Wiedeman further discloses that the receiver includes circuitry for combining together all equalized correlated signals to provide a demodulator with a composite received signal (see column 15, last paragraph). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Wang as suggested by Wiedeman in order to transmit the majority of the signal over the communication path (or paths) which are capable of conveying a highest quality signal (See column 16, first paragraph) and as the result increase the performance of the receiver.

9. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wang and Wiedeman, further in view of Borowski (US 3,997,841).

As to claim 2, Wang discloses that the measurement of the scatterer coefficients has been taken place in the time domain (see the abstract and page 1443, right

column). Wang and Wiedeman disclose all the subject matters claimed in claim 2, except that the equalization of the data signal takes place within the time domain. Borowski discloses that the advantages of the time-domain equalizers are that sufficient noise suppression can be achieved, which permits the use of a low-noise amplifier with sufficient control range (see column 1, paragraph 4). Therefore, for the reasons stated above, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Wang and Wiedeman to use a time domain equalizer to equalize the data signal.

10. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wang and Wiedeman, further in view of Schenk et al. (hereafter, referred as Schenk) (US 6,647,076).

As to claim 5, Wang discloses that the measurement of the scatterer coefficients has been taken place in the frequency domain (see the abstract and page 1443, right column). Wang and Wiedeman disclose all the subject matters claimed in claim 5, except that the equalization of the data signal takes place within the frequency domain. Schenk discloses that a frequency domain equalizer is used for the channel equalization of a signal vector (see column 5, lines 35-40). Schenk further discloses that the frequency domain equalizers require a smaller outlay on circuitry than time domain equalizers and can be implemented as a simple and fast algorithm and as a simple circuit (see column 2). Therefore, for the reasons stated above, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Wang and Wiedeman to use a frequency domain equalizer to equalize the data signal.

11. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wang and Wiedeman, further in view of Ratnarajah et al. (hereafter, referred as Ratnarajah) (US 6,757,339).

As to claim 9, Wang and Wiedeman disclose all the subject matters claimed in claim 1, except that a first measurement of the scatterer coefficients is implemented with the assistance of a known data sequence. Ratnarajah discloses a method for estimating the sequence of transmitted symbols in a digital communication system (see the abstract). Ratnarajah discloses that the channel impulse response coefficients (i.e. interpreted as scatterer coefficients) are determined from training symbols embedded in the transmitted data sequence (See column 1, lines 37-49). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Wang and Wiedeman as suggested by Ratnarajah, to more accurately determine the coefficients.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leila Malek whose telephone number is 571-272-8731. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Leila Malek
Examiner
Art Unit 2611

L.M.

MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER